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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: **SYSTEMS OF SPERM CELL PRESERVATION AND PROCESSING**

(57) Abstract: The preservation of sperm cells, and other processing of sperm cells, are disclosed. The present invention is directed in some embodiments to sperm cell preservation, as sperm cell preservation may further relate to artificial insemination, in vitro fertilization, super-ovulation, mammal production, sperm samples, and sperm cell processing, generally. The present invention is also directed in some embodiments to sperm cell processing features, such as collecting, handling, sorting, storage, transportation, use, fertilization, or insemination techniques. Sperm cell preservation in accordance with the present invention may address maintenance or enhancement of sperm quality, and in some embodiments one or more sperm cell characteristics, such as viability, motility, and functionality. Fertilization rates may also be maintained or enhanced. An embodiment may comprise obtaining sperm cells (10). The sperm cells may be cryopreserved (20) and thawed (30). Processing (40) may be performed on the sperm cells and cryopreservation of the sperm cells (50).

WO 2004/024227 A3

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/30814

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : C12N 15/00, 5/00, 5/02; A01N 1/00, 1/02

US CL : 800/21; 435/325, 1.3, 374

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 800/21; 435/325, 1.3, 374

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WEST, MEDLINE, BIOSIS, EMBASE, SCISEARCH, CAPLUS

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	SCHENK J.L. et al. Cryopreservation of flow-sorted bovine spermatozoa.	1-14, 20-21, 31-56,
---	Theriogenology. 1999, Vol. 52, pages 1375-1391, see entire document.	62-63, 73-87, 88-110
X		-----
		15-19, 57, 111-112
Y	STAP J. et al. Improving the resolution of cryopreserved X- and Y-sperm during DNA	1-14, 20-21, 31-56,
---	flow cytometric analysis with the addition of percoll to quench the fluorescence of dead	62-63, 73-87, 88-110
X	sperm. Journal of Animal Science. 1998, Vol. 76, pages 1896-1902, see entire	-----
	document.	15-19, 57, 111-112
A	HOLLINSHEAD F.K. In vitro and in vivo assessment of functional capacity of flow	1-14, 20-21, 31-56,
	cytometrically sorted ram spermatozoa after freezing and thawing. Reprod. Fertil. and	62-63, 73-87, 89-112
	Develop. 2003, Vol. 15, pages 351-359, see entire document.	
A	HOLLINSHEAD F.K. et al. Sex-sorting and re-cryopreservation of frozen-thawed ram	1-14, 20-21, 31-56,
	sperm for in vitro embryo production. Theriogenology. 01 January 2003, Vol. 59, No.	62-63, 73-87, 89-112
	1, page 209, see entire page.	



Further documents are listed in the continuation of Box C.



See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

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later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X"

document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y"

document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&"

document member of the same patent family

Date of the actual completion of the international search

23 February 2004 (23.02.2004)

Date of mailing of the international search report

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INTERNATIONAL SEARCH REPORT

PCT/US03/30814

C. (Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	HOLLINSHEAD F.K. et al. Production of lambs of predetermined sex after insemination of ewes with low numbers of frozen-thawed sorted X- or Y- chromosome-bearing spermatozoa. Reprod. Fertil. and Develop. 2002, Vol. 14, pages 503-508, see entire document.	1-14, 20-21, 31-56, 62-63, 73-87, 89-112
A	SEIDEL G.E. Economics fo selecting for sex: the most important genetic trait. Theriogenology. 2003, Vol. 59, pages 585-598, see entire document.	1-14, 20-21, 31-56, 62-63, 73-87, 89-112

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US03/30814

Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This international report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claim Nos.: 22-24, 28-30, 64-67 and 70-72
because they relate to subject matter not required to be searched by this Authority, namely:
The scope of claims 22-24, 28-30, 64-67 and 70-72 embraces a human, which is non-statutory subject matter.
2. ☒ Claim Nos.: 58
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
Claim 58 is wholly unclear because it is drawn to a method as described in claim 57, however, claim 57 is drawn to a product, not a method.
3. ☒ Claim Nos.: 25, 27 and 29
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

☐
☐

The additional search fees were accompanied by the applicant's protest.

No protest accompanied the payment of additional search fees.